



## **ASCAT vs. borehole data for extracting seasonal freeze/thaw cycling in soil**

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Freeze-thaw (F/T) cycling in soil is a main driver of physical weathering in polar latitudes. The higher the amount of F/T is during a season the greater is the production of debris that will result from rock breakdown. The ASCAT sensor (Advanced SCATterometer aperture radar on board of Metop) provides an estimate of seasonal F/T due to a daily coverage of northern latitudes at  $>50^\circ$ . It operates at 5.255 GHz (C-band) and is sensitive to detect frozen and unfrozen conditions in soil. Whereas the spring signatures suffer from a snow melt response that dominates much of the backscatter, the autumn signals with little to no snow cover can be validated using borehole temperature data. We use temperature time series of two sites in the Russian Arctic (El'gygytgyn Impact Crater, mountainous Chukotka; Mamontovy Klyk, northern Yakutian lowland) for comparing satellite derived F/T with ground truth derived F/T. On the basis of error bars we examine the potential to create a pan-arctic map that aids interpreting the physical weathering dynamics in the north.